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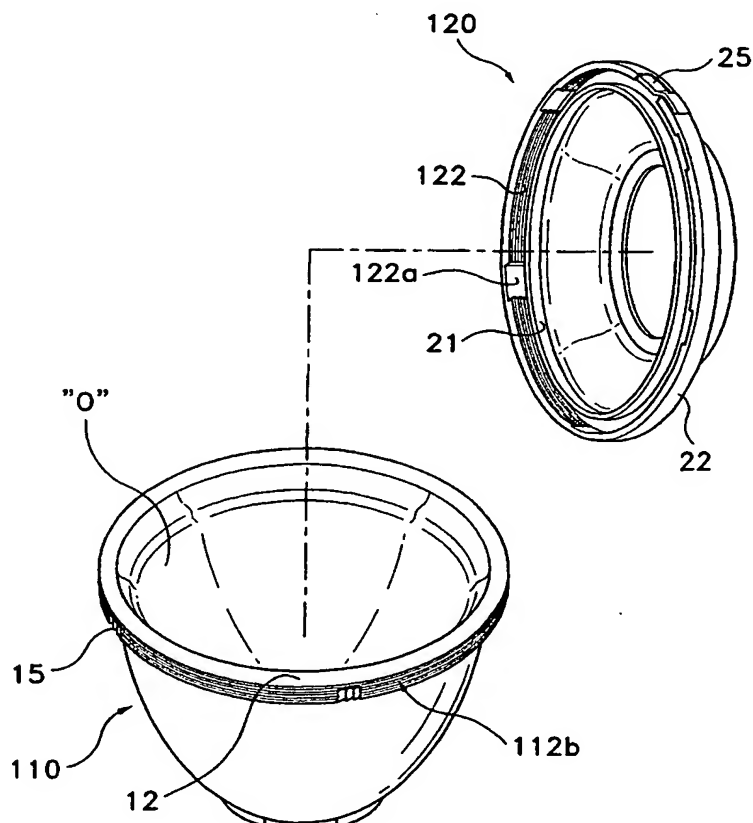
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(54) Title: RESPIRATORY VESSEL USING ELASTICITY OF PLASTICS FOR FERMENTATION FOOD



(57) Abstract: This invention is about a respiratory food vessel to keep fermentation food fresh, which performs discharging gas from fermentation by allowing the lid to modify itself as the inside gas pressure of the vessel increases and the modification of the lid is based on elasticity of plastic material. The above-mentioned vessel comprises a main body (110) having a bulb-shaped space inside, a lid (120) having a cylinder-shaped intercepting part (21) that is supposed to attached to the inside of the main body and a connecting part between the main body and the lid. The first thing that happens when it comes to performing the purpose of this invention is that the above connecting part forces the inside of the main body and the separating part to close together, leading to primary sealing. And the next thing to happen is that the sand-blastered part between the first flange (12) located in the upper side of the main body and the second flange (22) located in the outskirts of the lid prevent liquid material alone from being released but not gases, resulting in secondary sealing.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## **RESPIRATORY VESSEL USING ELASTICITY OF PLASTICS FOR FERMENTATION FOOD**

### **TECHNICAL FIELD**

5           The present invention relates to a food storage vessel, and more particularly to a respiratory vessel using elasticity of plastics for fermentation food.

### **BACKGROUND ART**

          Generally, as a vessel to store and to preserve food, a glass bottle, a PET bottle,  
10   a pouch, or a plastic bag is used as the body and a cover that is connected to the body.

          When the food in a vessel needs to be stored for a long period of time, minimizing its deterioration is important. However, in case that the vessel contains food with water and spices, it has disadvantages of being damaged due to expansion or increase of the pressure by gas produced in a fermentation process.

15           To explain it in more detail, fermentation food such as kimchi or salted fish contains main substances such as vegetables or fishes, additives (spices, etc.) added to the main substance, and water which comes out from the main substances in the aging process with some passage of time, and which is normally called as kimchi juice.

          However, the taste of the food is bad because of gases which are produced  
20   during fermentation process.

          Therefore, it is important to minimize gases that exist in the vessel so as to preserve the taste for the food for a long term.

And in case of commercialization, the fermentation food is put in such a vessel as a usual pouch, a PET bottle or a glass bottle in a state of immaturity in due consideration of distribution term. Since there is no specified vessel for fermentation food, it needs an additional vinyl bag or a compressed Styrofoam to prevent the kimchi juice from draining out of the inside of the vessel. And, whether it is opened or not is confirmed by customers themselves using a contracting film on the outside of the vessel.

Above explained, the conventional vessel may prevent the liquid(or kimchi juice) from draining out due to a completely sealed-up structure, but, the taste of the food is bad because of gases which are produced in fermentation process and which remain inside the vessel without discharging which may lead the seal to be damaged or the vessel to be broken with the internal pressure of the vessel increased.

## DISCLOSURE OF INVENTION

The present invention is devised to solve the problems described above and it is an object of the present invention to provide a respiratory food vessel using elasticity of plastics that may contain food while it is separated from external air thus is different from the existing ones.

It is another object of the present invention to provide a respiratory vessel using elasticity of plastics for fermentation food that may release gas to the outside when internal pressure is increased due to gas produced in fermentation process.

In order to achieve the objects above, a respiratory vessel using elasticity of

plastics for fermentation food having a body, a cover and means connecting the body and the cover, characterized in that the vessel further comprises a shutting part being formed in one of the body and the cover, and the contacting part is formed in the other of the body and the cover, wherein the shutting part contacts tightly the contacting part to seal the inside of the body.

The shutting part may be elastically deformed by the connection force of the connecting devices, its contacting surface that touches the shutting part is curved, and it may have a cylinder shape. Here, the contacting surface that touches the shutting part may be either a circular cone or a circular spherical surface.

Also, the shutting part described above may be attached to the lower part of the cover, and a pathway that may release gas to the outside of a vessel is formed. The pathway described above may be formed at the contact part between the body and the cover. Here, it is desirable that a sanding part is formed for gas release and sealing.

It is desirable for gas release that the cover described above has less rigidity than that of the body so that the cover may be elastically deformed according to the internal pressure increase.

Here, the first flange is formed following the circumference of the upper part of the body, the second flange following the circumference of the cover, and the contact part is formed through the contact of the first flange and the second flange by the connecting device described above. The cover possesses curved surface between the center of the cover and the second flange, and the shutting part may be arranged in between the curved surface and the second flange.

It is desirable that the sectional thickness of the cover to which the shutting part is attached is relatively small so that it eases gas release following the elastic deformation of the cover. Also, the cover described above may possess plane surface that is extended from the curved surface to the center.

5           On the outside surface of the first flange a landing groove and a guide groove that are different in heights are formed, and on the contacting surface of the second flange a locker that may be introduced into the guide groove is formed. The connecting device described above contains a landing groove and a locker that is introduced to the guide groove and is fit to the landing groove.

10           Here, the first flange is cut downward extending to the outside and the lower part of it and is again cut to the outside direction. The second flange described above may be cut extending to the outside so that it may land on the lower part of the first flange that is cut to the external direction.

15           Also, the length of the first and the second flange cuts may be longer than that of the shutting part.

20           Also, the circumference part of the first and the second flange is a circular shape, and the connecting device described above contains a male screw part that is formed outside of the first flange and a female screw part that is formed inside the second flange and is rotating together with a corresponding male screw part described above.

Here, it is desirable for gas release that the grooves that are different in heights are formed on the outside of the first flange.

Also, in the respiratory vessel using elasticity of plastics for fermentation food according to the prevent invention, it is desirable for the open and sealed states of the vessel that the vessel contains a saw tooth shaped latch that has singly directed hanging chin and is formed on the side of the first flange, and a latch stopper that is arranged at  
5 the side of the second flange and concords with the latch described above.

The latch stopper described above is equipped with a handle tap and it is desirable that it sticks to the second flange so that the latch stopper may be removed by applying the external force to the handle tap to confirm the sealed state to the customer.

Meanwhile, a foot is formed at the lower side of the vessel and this foot may be  
10 incised to several pieces so that the inside and outside of the foot may be well ventilated.

Also, at the upper side of the cover, a groove that the foot of the vessel described above is landed may be formed.

### BRIEF DESCRIPTION OF THE DRAWINGS

15 The above objects, features and advantages of the present invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings, in which:

Figure 1 is an example of the present invention and a separate perspective view of the respiratory vessel using elasticity of plastics for fermentation food

20 Figure 2 is a cross-sectional view of the vessel for fermentation food according to the I-I line in Figure 1.

Figure 3 is a cross-sectional view of the vessel for fermentation food

With a body and a cover coupled.

Figure 4 is a partially enlarged perspective view of the coupling and sealing devices of the vessel for fermentation food.

Figure 5a to 5d are illustrations of gas release procedure. Figure 5a illustrates  
5 gas generating state inside the vessel that is tightly closed. Figure 5b illustrates the  
inflating state by elastic deformation of the cover due to internal pressure increase.  
Figure 5c is a partially cross-sectioned view according to the II-II line in Figure 1 and  
illustrates the state that the shutting part is opened inside and gas is released from the  
inside to the outside of a vessel. Figure 5d illustrates the elastically restored state of a  
10 cover after gas is released.

Figure 6 is an illustration of the state in Figure 5c where the sectional thickness  
of the curved surface of the cover is changed.

Figure 7 is a separate perspective view of the body and the cover as a variation  
of the coupling device that may be applied to the vessel for fermentation food according  
15 to the present invention.

Figure 8 and 9 are another examples of the present invention on the brim of the  
body and the cover of the vessel, respectively.

Figure 10 is a base plane view of the body of the vessel according to the present  
invention.

20

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Hereinafter, a respiratory vessel using elasticity of plastics for fermentation food



in accordance with the present invention will now be described with reference to the accompanying drawings.

Figure 1 illustrates the vessel for fermentation food is shown with a cover 20 and the body 10 separated, Figure 2 illustrates a cross-sectional view according to the I-I line in Figure 1, and Figure 3 illustrates a cross-sectional view in which the vessel is shown with the cover 20 and the body 10 coupled.

Referring to Figure 1 to 3, the vessel for fermentation food of the present invention as an embodiment contains the body 10 and the cover 20 that is coupled with the body 10. Here, it is desirable that the material of the vessel be elastically deformed corresponding to the internal pressure increase of the vessel.

The body 10 has a half spherical shape in which a storage space S to store the fermentation food and an open part O that is sealed by the cover 20 are formed.

The cover 20 is dish shaped and is connected to the body 10. It has a flange 22 on the brim, a curved surface 26 sloped with a predetermined angle between the flange 22 and the central part of the cover 20, and a plane part 27 that are extended from the curved surface 26 to the center of the cover. Also, a cylinder shaped shutting part 21 is protrusively formed on the lower side and the shutting part 21 may exist either in the flange 22 or in between the flange 22 and the curved surface 26.

When fermentation food is admitted to the storage space S of the body 10 and the cover 20 is coupled with the body, the shutting part 21 is introduced while adhering close to the sloped contacting surface of the body 10 that has circular section, and the inside of the vessel is closed tightly with the elasticity between the shutting part and

inside of the vessel. That is, the shutting part 21 is adhered closely to the contacting surface of the body with elastically deforming in a connecting force of the coupling device that will be described later. Here, one side of the shutting part 21 that are adhered closely to the contacting surface of the body 10 needs to be rounding-treated for a smooth contact.

Here, the shape of the body is illustrated as a half-spherical shape. However, the shape of the body according to the present invention is not limited to half-spherical and does not have a limit in its shape only if the shutting part 21 of the cover 20 may be adhesively inserted to the open part 0. Also, the shape of the body may be changed in various ways by modifying the design according to customers' tastes except the part that the shutting part 21 is inserted. Although the shutting part 21 is formed in the cover according to the figure, the shutting part 21 described above may be formed or attached to the body by changing the shape of the body 10 and the cover 20. Here the "contacting surface" is a part of the inside of the body to which the shutting part 21 is inserted to. The contacting surface may be a conical or spherical surface.

To maintain the sealed state by the shutting part 21 which is adhered to the contacting surface of the body, the body 10 and the cover 20 have their connecting device, and which comprises a locker 22a provided on the cover 20 and a landing groove 12b provided on the body 10 as an example.

At the lower side of an body 10, a foot 10a is formed, and by inserting the foot 10a into a groove 27a formed at the upper side of the cover 27, vessels may be loaded easily top and bottom and the vessels loaded do not slide easily.

Figure 4 is partially enlarged perspective view in which a connecting devices are shown.

According to Figure 2 and 4, a flange (12: "the first flange" hereafter) extended from the brim of the body 10 and cut to the outside following the circumference of the brim is provided. Several landing surface 12b and guiding surface 12a that are different in heights are formed successively at the side of the first flange 12.

Also a flange (22: "the second flange" hereinafter) overlapped with the first flange 12 of the body 10 formed at the cover 20. That is, the second flange 22 is in a shape that is extended to the outside and cut. At the lower inside of second flange 22, the shutting part 21 is formed (refer to Figure 2 and 3).

Here, it is desirable that the length of the first flange 12 and the second flange 22 cut are longer than that of the shutting part 21 to maintain more stable connect state.

The locker 22a is protrusively formed at a position corresponding to the guiding surface 12a on the contacting surface of second flange 22 cut.

A sanding part 23 that is surface treated with sand blasting method is formed at the connection part between the first flange 12 and the second flange 22 according to Figure 5c and 6. This enables the formation of the minute gas pathway between the first 12 and the second flange 22 that are closely adhered to in gas release operation that will be described later. Here the sanding part 23 provides an example as a path that gas may pass through from the sloped contacting surface of the body to the outside of the vessel.

The sanding part 23 prevents the outflow of water from the inside quickly even though the food vessel is upside down.

An explanation of the connecting and gas releasing movement after fermentation food is put into the body 10 and the cover 20 is coupled the body, which are equipped with the shutting part 21 and the connecting device, with reference to Figure 4, 5a, and 5d, is as follows.

5           Figure 5a through 5d illustrate gas-releasing procedure. Figure 5a illustrates gas generating state in the vessel that is tightly closed. Figure 5b illustrates the inflating state by elastic deformation of the cover 20 due to internal pressure increase. Figure 5c is an illustration in a state that the shutting part is opened inside and gas is released from the inside to the outside of the vessel. Figure 5d illustrates a elastically restored state of  
10   the cover 20 after gas is released.

Referring to Figure 4 and 5a, the shutting part 21 of a cover 20 is inserted to the open part 0 of the body 10 after the fermentation food is put in, and after the locker 22a is inserted to the guiding surface 12a and the cover 20 is rotated so that the locker of a cover 20 is fitted to the lower side of the landing groove 12b, then the inside of the  
15   vessel is elastically sealed in first by the insertion of a shutting part 21 into the body 10. And, the inside of the vessel is tightly closed additionally by the mutual contact of the first flange 12 and the second flange 22, and is simultaneously maintained the sealed state.

Gas is generated inside the vessel by a biochemical reaction when fermentation  
20   food such as kimchi is stored or distributed in such a food vessel (refer to the arrow "B").

Referring to Figure 5b, the internal pressure of the vessel is getting increased as

gas is generated, and the cover 20 is inflated by elastic deformation corresponding to the increase (refer to the arrow "C"). The shutting part 21 attached to the cover 20 is detached from the contacting surface of the body 10 and a gap between the contacting surface of the body 10 and the shutting part 21 is formed.

5 Referring to Figure 5c, when the sealed state of inside of the vessel is removed, gas inside is released through the pathway formed by the gap between the contacting surface of the body 10 and the shutting part 21 and by the sanding part between the first flange 12 and the second flange 22 (refer to the arrow "D").

Referring to Figure 5d, internal pressure of the vessel is decreased by gas  
10 release to outside of the vessel, and the elasticity of the cover 20 is recovered so that inside of the vessel becomes tightly closed by the close adhesion of the shutting part 21 to the inside of the body 10.

To ease gas release operation by elasticity, it is desirable that the cover 20 uses material with bigger elasticity and have less rigidity in structure than that of the body 10.

15 In case that internal pressure of the vessel is increased due to the gas, it is desirable that the sectional thickness of the shutting part's 21 circumference is relatively thin so that the rigidity diminishes and the sealing function of a shutting part 21 following by elastic deformation of the cover 20 is removed (refer to the Figure 6).

As seen, the respiratory vessel using elasticity of plastics for fermentation food  
20 may be used for a simple food storage, however, it may also be used as a packing vessel that makes available itself for a distribution. In this case, it is desirable that the vessel is equipped with a indicating device so that the customers themselves may confirm its

sealing state.

Referring to Figure 4, the indicating device is, for example, comprised of a latch part 15 and a stopper 25.

The latch part 15 is formed on the side of the landing surface 12b 14 of the first  
5 flange 12 of the body 10, which has a saw tooth comprising a hanging chin and a sloped surface.

The latch stopper 25 is provided on the side of a cover 20 so that it may  
concord with the latch part 15. The latch stopper has a saw tooth in the opposite  
direction compared with that of the latch part 15 so that it may mutually operated with  
10 the latch part 15 and may moves to a single direction.

That is, when the cover 20 is rotated as attached to the body 10, the latch  
stopper 25 goes over the sloped surface of the latch part 15. However, in case the cover  
is rotated to the opposite direction, the latch 15 and the latch stopper 25 are caught in  
the hanging chin.

15 It is desirable that the handle tap 25b is equipped in the latch stopper 25 so that  
it may ease the rotation when the cover 20 is rotated releasing the latch stopper 25 from  
the hanging chin of the latch part 15.

It is also desirable that the latch stopper 25 is released easily from the cover 20  
when the handle tap 25b is pulled toward the outside (refer to arrow "A"). As an  
20 example, the latch stopper 25 is attached to the cover 20 by four thin connecting parts  
25a as shown in the Figure.

Therefore, when the vessel with fermentation food rides along the distribution

process, a customer may judge whether it is opened or not by confirming the damage of the handle tap 25b.

And, although the locker 22a and landing groove 12b that are formed at the first and the second flange 22, 12 are described as examples of connecting devices for the vessel according to the present invention, the connecting device is not limited to this  
5 and various connecting devices that are used in the field of this invention may be used.

Figure 7 illustrates a variation of the connecting device that may be applied to the vessel for fermentation food according to the invention and it is the partial perspective view of the body 110 and the cover 120 of a vessel. Here, the same symbol  
10 on figures illustrated previously stands for the same part with same function.

Referring to Figure 7, a male screw part 112b is formed on the outside of the first flange 12 of the body 110, and a female screw part 122 that is a rotating counterpart of the male screw part 112b is formed on the inside of the second flange of a cover 120.

Therefore, the body 110 with male screw part 112b and the cover 120 with a  
15 female screw part 122 is screw-connected by rotation.

Here, to ease gas release in case of an internal pressure increase due to gas generation, it is desirable that the groove 122a that is similar to the guiding groove 12a in Figure 4 is formed.

Also, more stable connection may be achieved by cutting the lower end part of  
20 the first flange 12 of the body 110 to the outside so that it may support the lower end part of the second flange 22' as shown in Figure 8 and 9.

As seen in Figure 9, a groove 110a may be formed so that the lower end part

21a of the shutting part 21 may be inserted to the contacting surface of the body 10 that contacts the lower end part 21a of the shutting part 21.

Figure 10 illustrates the lower side of the body of a vessel according to the invention and it shows that the foot 10a is cut into several pieces so that the inside and  
5 outside of the foot formed at the lower side of the body 10 may be well ventilated.

By this, when the vessel is placed on a flat table such as a dining table, it prevents the sliding of the vessel by the generation of a steam H corresponding to the temperature difference of the inside and outside of the lower side of a vessel.

It may be especially useful that the vessel in the present invention is used for  
10 containing hot food.

### INDUSTRIAL APPLICABILITY

The vessel described above may be used as a packing vessel that may store food for a long term without damaging the vessel while maintaining freshness by gas  
15 release in the distribution process as well as it may be used for simple food storage, especially fermentation food by isolating food from external air.

### WHAT IS CLAIMED IS

20 1. A respiratory vessel using elasticity of plastics for fermentation food having a body, a cover and means connecting the body and the cover, characterized in that the vessel further comprises a shutting part being formed in one of the body and the cover, and the



contacting part is formed in the other of the body and the cover, wherein the shutting part contacts tightly a contacting part to seal the inside of the body.

2. The vessel of claim 1, wherein the shutting part is elastically deformed by the  
5 connection force of the connecting device.

3. The vessel of claim 2, wherein the contacting surface which contacts the shutting part is curved.

10 4. The vessel of claim 3, wherein the shutting part has a cylindrical shape.

5. The vessel of claim 4, wherein the contacting surface which contacts the shutting part is a circular cone.

15 6. The vessel of claim 4, wherein the contacting surface which contacts the shutting part is circular spherical surface.

7. The vessel of claim 4, wherein a groove to which the lower part of the shutting part is inserted is formed on the contacting surface which contacts the shutting part.

20

8. The vessel of claim 4, wherein the shutting part is attached to the lower part of the cover.

9. The vessel of claim 8, wherein a pathway is formed between the body and the cover so that gas is released from the sloped contacting surface to outside of the vessel.

5 10. The vessel of claim 9, wherein the pathway described above is formed at the contact part of the body and the cover connected by a connecting device.

11. The vessel of claim 10, wherein the sanding part is formed at the contact part described above.

10

12. The vessel of claim 10, wherein the cover has less rigidity than that of the body so that it may elastically deformed according to the internal pressure increase.

13. The vessel of claim 12, wherein the first flange is formed following the  
15 circumference of a upper part of the body, the second flange is formed following the circumference of the cover, and the contact part is formed through the contact between first and second flange by the contacting device.

14. The vessel of claim 13, wherein the cover is equipped with curved surface part  
20 between the center of a cover and the second flange, and the shutting part is placed between the curved surface part and the second flange.

15. The vessel of claim 14, wherein the sectional thickness of the cover to which the shutting part is attached is relatively small.

16. The vessel of claim 15, wherein the cover is equipped more with a plane surface  
5 part that is extended from the curved surface part to the central part.

17. The vessel of claim 13, wherein a landing groove and a guide groove that are different in heights are formed on the outside of the first flange, a locker is formed for the guide groove to be inserted to on the inside of the second flange, and the connecting  
10 device includes the landing groove and the locker that is introduced to the guide groove and is fitted to the landing groove.

18. The vessel of claim 17, wherein the first flange is extended to the outside and cut, and the second flange is extended to the outside and cut so that the first flange may be  
15 inserted to.

19. The vessel of claim 18, wherein the part of the first and second flange cut are longer than that of the shutting part.

20. The vessel of claim 17, wherein the first flange is cut downward extending to the outside and the lower part of it is again cut to the outside direction, and the second flange described above may be cut extending to the outside so that it may be landed at

the lower part of the first flange that is cut to the outside direction.

21. The vessel of claim 13, wherein the circumference part of the first and the second flange is circular, and the connecting device contains a male screw part that is formed  
5 on the outside of a first flange and a female screw part that is a rotating counterpart of the male screw part.

22. The vessel of claim 21, wherein the grooves that are different in heights are formed on the outside of the first flange.

10

23. The vessel of claim 13, wherein a saw tooth shaped latch that has singly directed hanging chin is formed at the side of the first flange, and a latch stopper that is placed on the side of the second flange and concords with the latch.

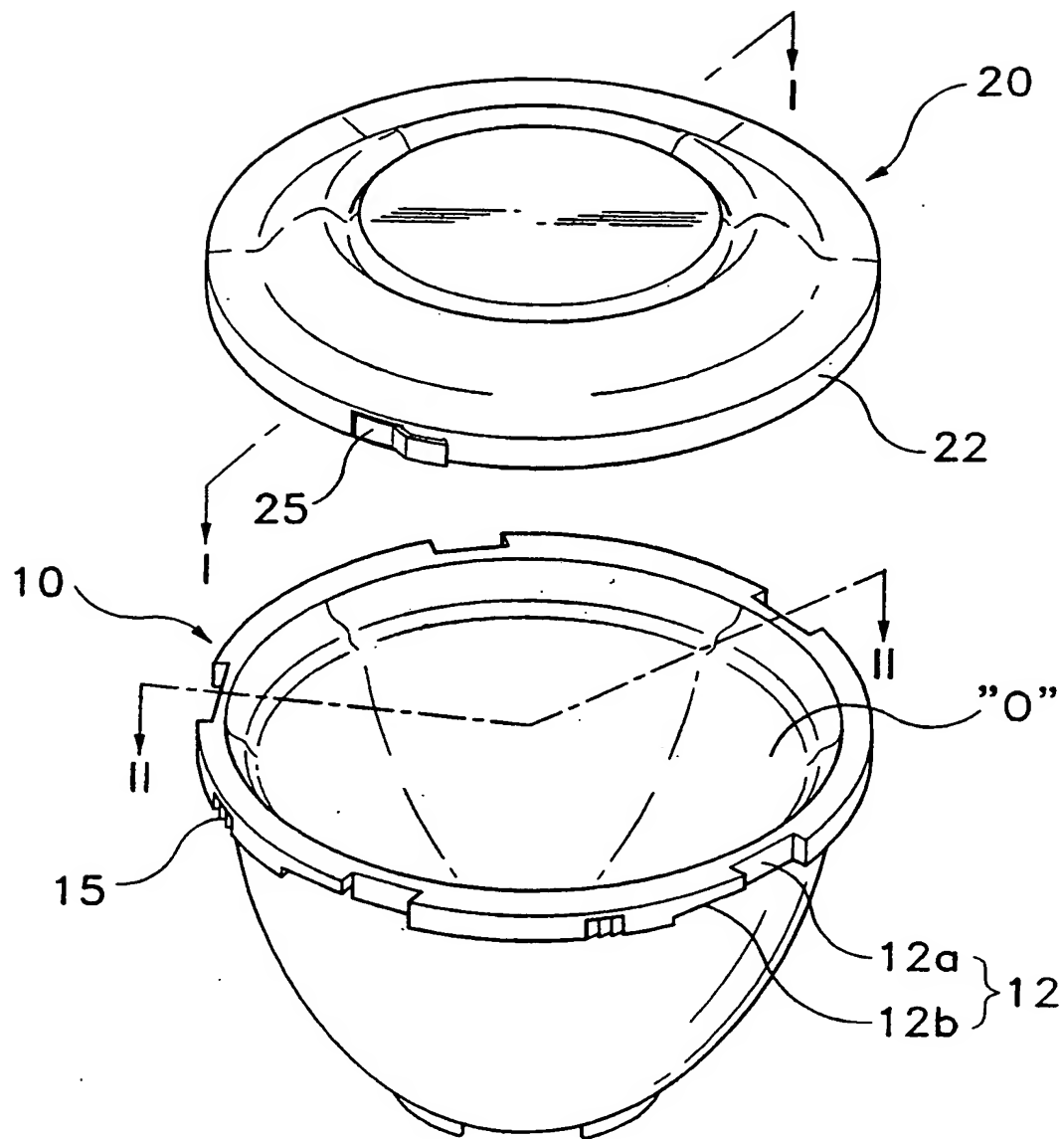
15 24. The vessel of claim 23, wherein the latch stopper is equipped with a handle tap, and the latch stopper is attached to the second flange so that it may be removed by giving the external force to the handle tap.

25. The vessel of claim 1, wherein a foot is formed at the lower side of the vessel and  
20 this foot is incised to several pieces so that the inside and outside of the foot may be well ventilated.

26. The vessel of claim 25, wherein a groove that the foot of the vessel is landed may be formed at the upper side of a cover.

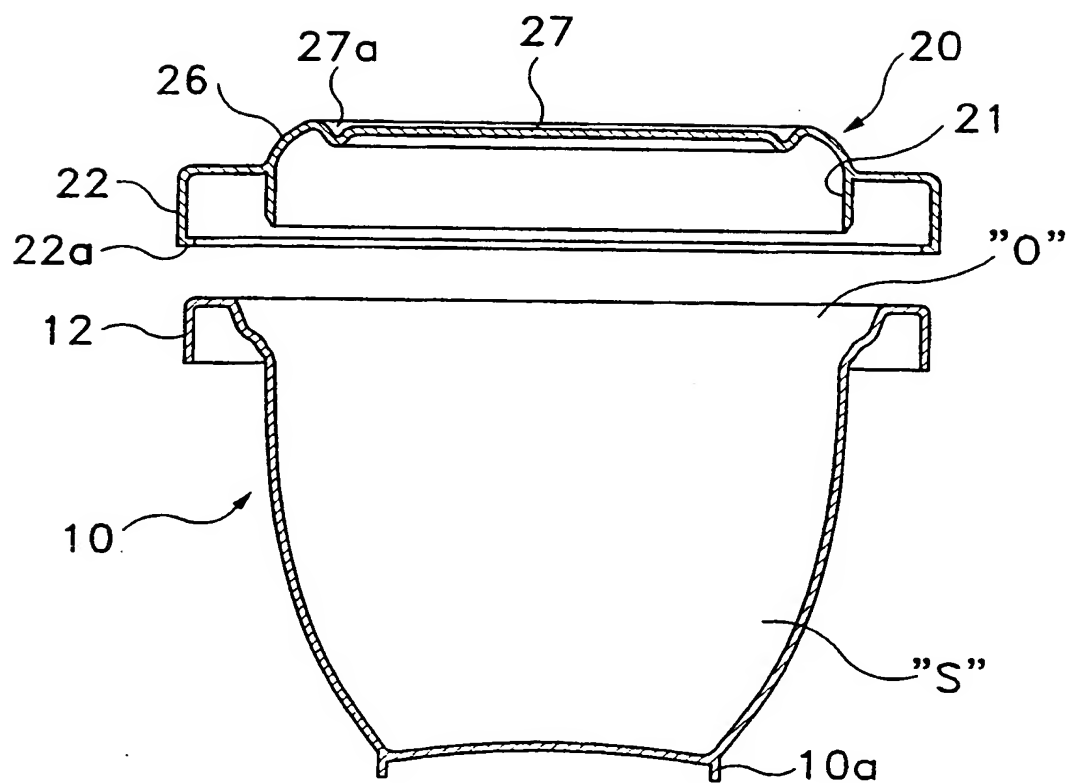
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FIG.1



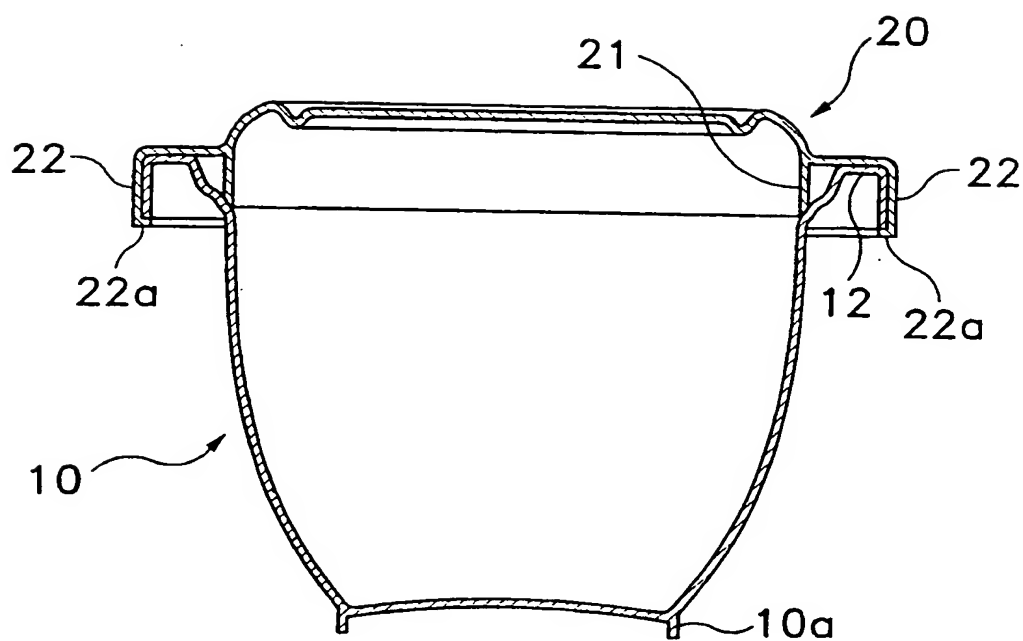
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FIG.2



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FIG.3







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FIG.5a

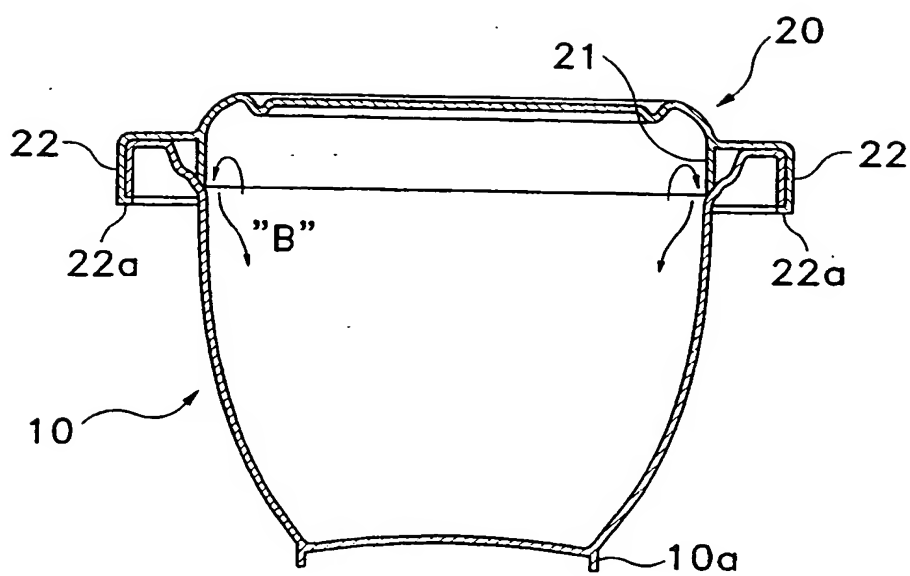
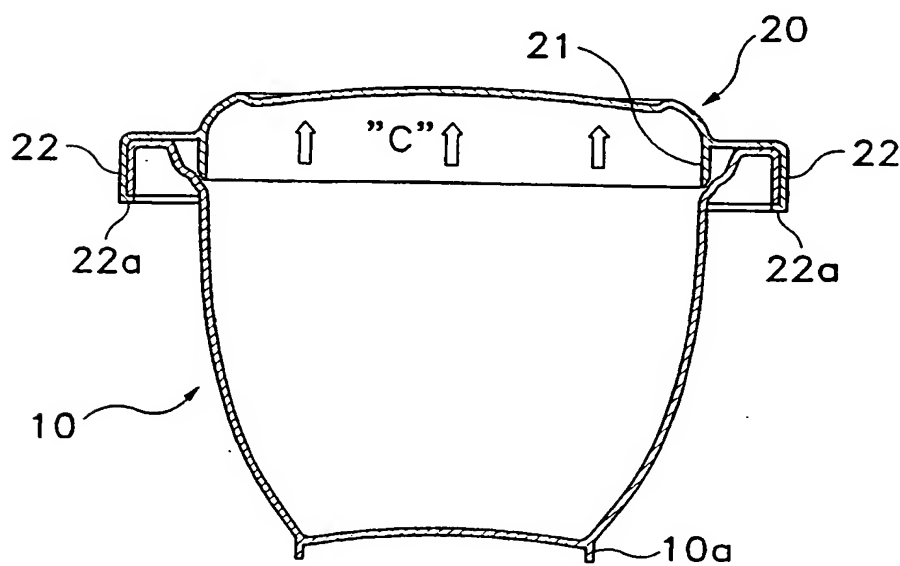


FIG.5b



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FIG.5c

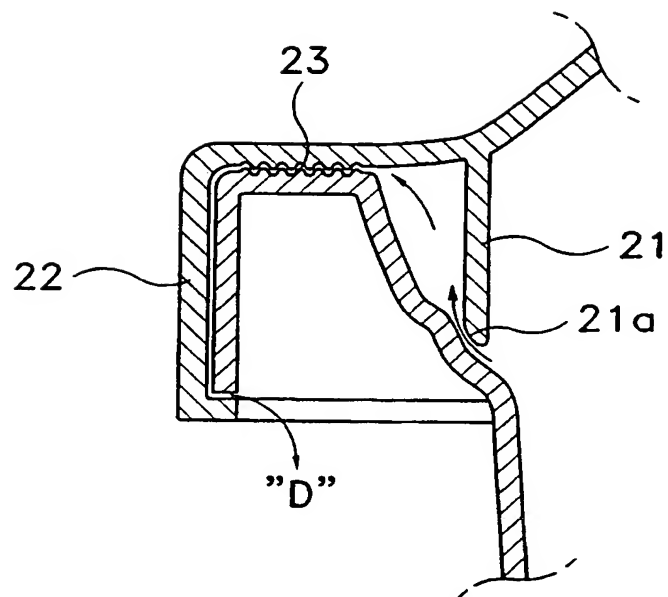
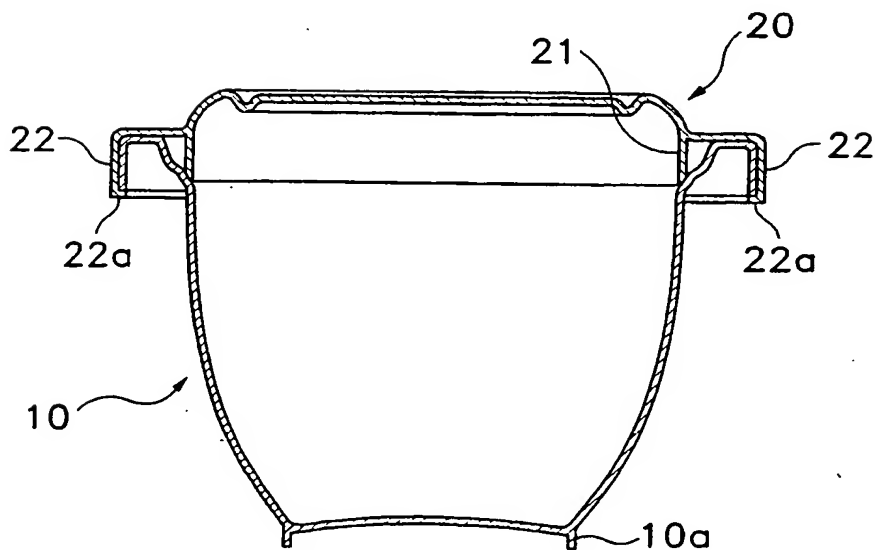
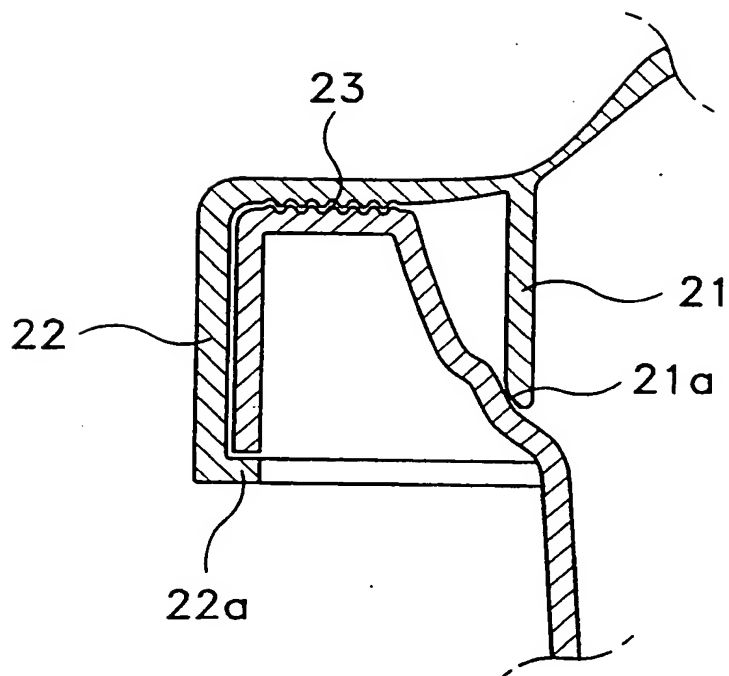


FIG.5d



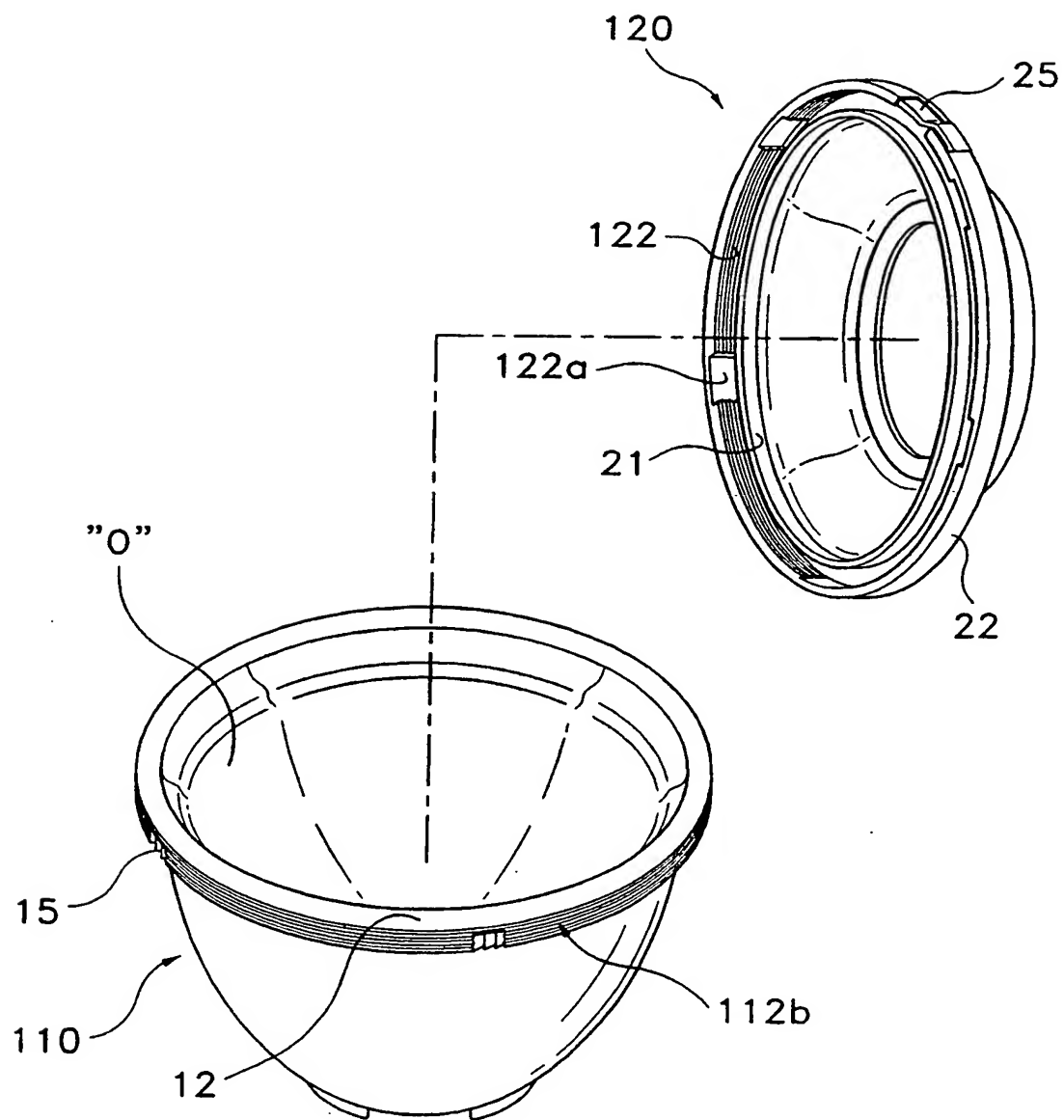
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FIG.6



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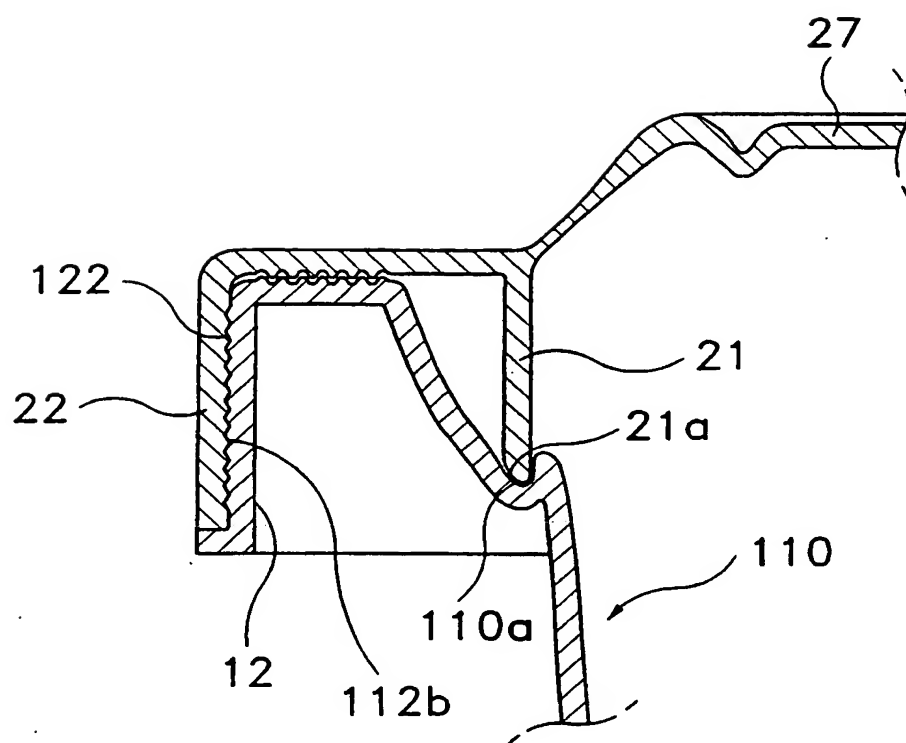
FIG.7





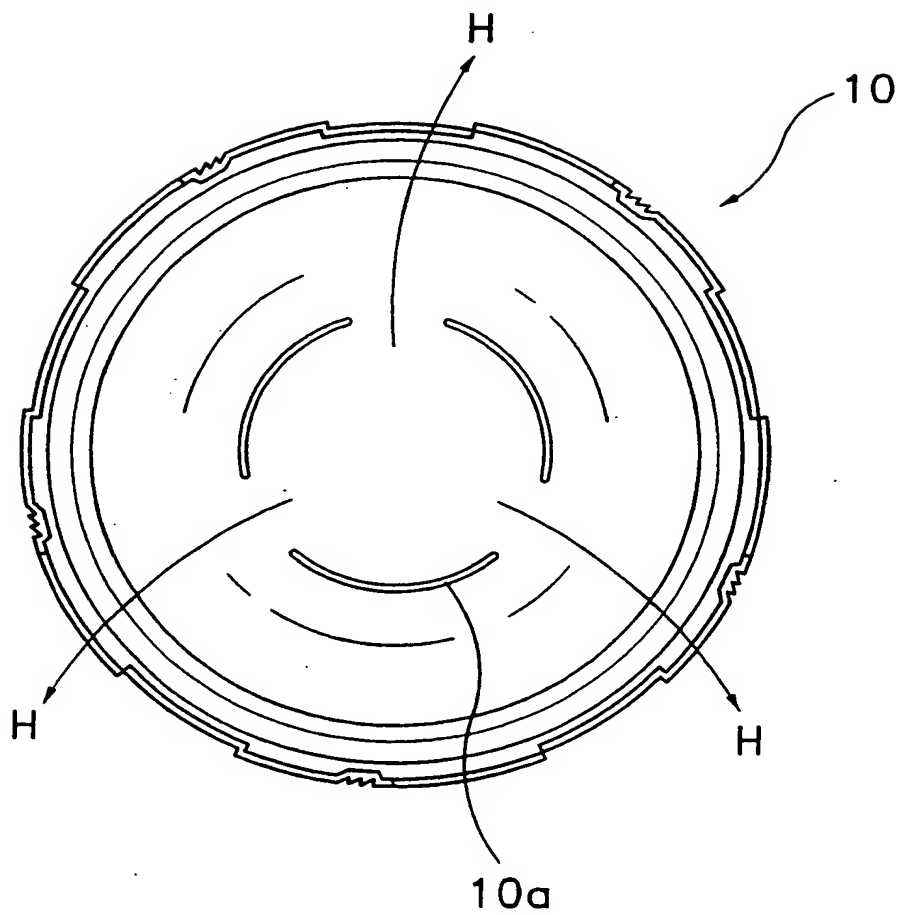
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FIG.9



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FIG.10





## INTERNATIONAL SEARCH REPORT

International application No.  
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**A. CLASSIFICATION OF SUBJECT MATTER**

**IPC7 A23B 7/10, B65D 81/26**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

A23B7/10; A23L1/218; A47J47/02.47/08; B65D41/04.41/16.47/00.51/16.81/26

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean patents and applications for inventions since 1975, Korean utility models and applications for utility models since 1975, Japanese utility models and applications for utility models since 1972

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

NPS, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 1997-10595 A (PARK, JUN-MYENG) 27 March 1997 see the whole document (particularly figure 4)	1-6
Y	KR 1998-1739 A (LEE, JEONG-MIN) 30 March 1998 see claim 1, the whole figure	1-6
A	JP 62-17882 U (NISEI INDUSTRIAL LTD.) 3 February 1987 see the whole document	1-6
A	JP 09-95348 A (YOSHINO KOGYOSHO CO LTD.) 8 April 1997 see the whole document	1-6

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search

30 MARCH 2001 (30.03.2001)

Date of mailing of the international search report

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

PCT/KR00/01475

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 1997-10595 A	27.03.1997	NONE	
KR 1998-1739 A	30.03.1998	NONE	
JP 62-17882 U	03.02.1987	NONE	
JP 09-95348 A	08.04.1997	NONE	